

## Technical Appendices

### Appendix J – Noise

Illingworth and Rodkin, Inc. Cochrane Road Retail Development  
Environmental Noise Assessment, Morgan Hill, California. May 17,  
2005.

***COCHRANE ROAD RETAIL DEVELOPMENT  
ENVIRONMENTAL NOISE ASSESSMENT  
MORGAN HILL, CALIFORNIA***

**May 17, 2005**

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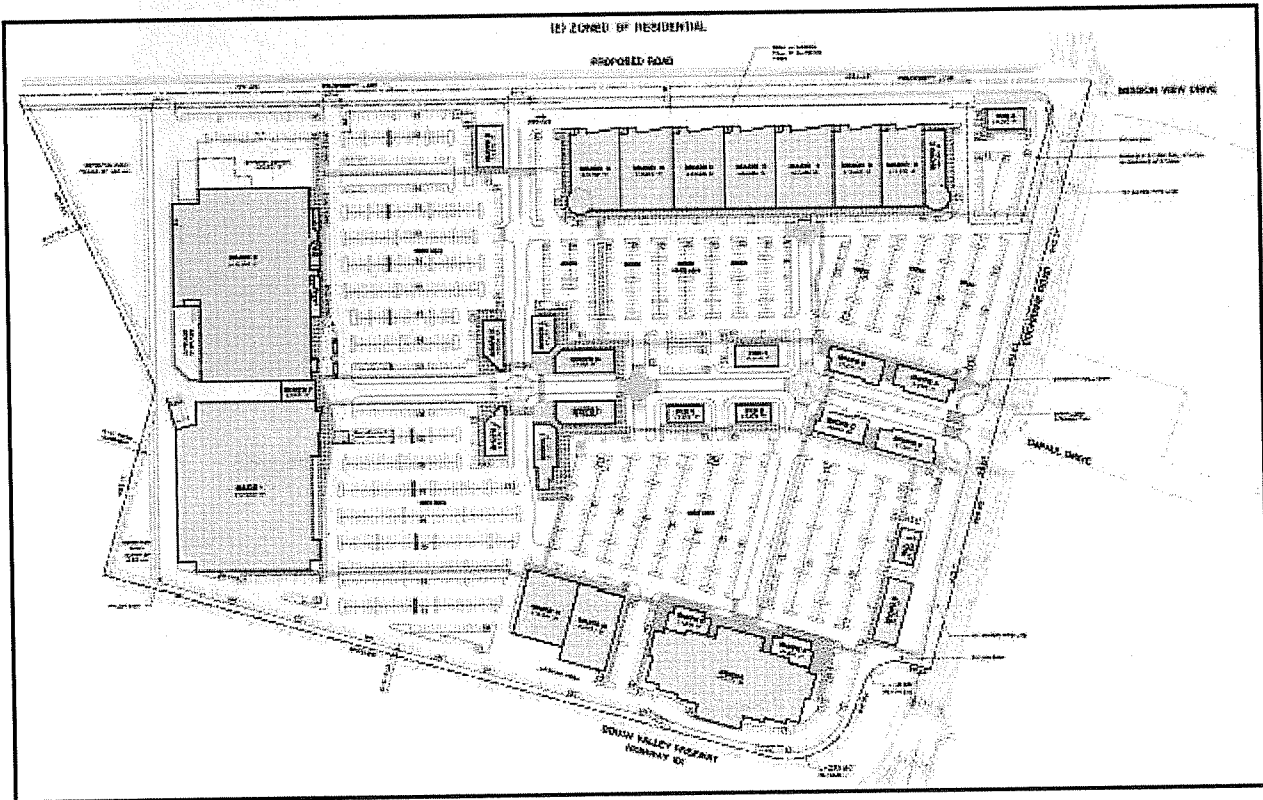
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**Job No.: 04-190**

## INTRODUCTION

This report presents the results of our environmental noise assessment for a 657,250 square foot shopping center on an approximately 66.49-acre site located on the corner of Cochrane Road and U.S. Highway 101 in the City of Morgan Hill, California (Figure 1,below). This analysis provides a discussion of noise policies and standards applicable to the project, results of ambient noise measurements conducted at adjacent noise sensitive land uses, an evaluation of the project's compatibility with these adjacent noise sensitive land uses, and measures designed to reduce project generated noise below standards established by the City of Morgan Hill. Persons not familiar with environmental noise analysis or the City of Morgan Hill's noise standards are referred to Appendix A and B of this report for additional information.

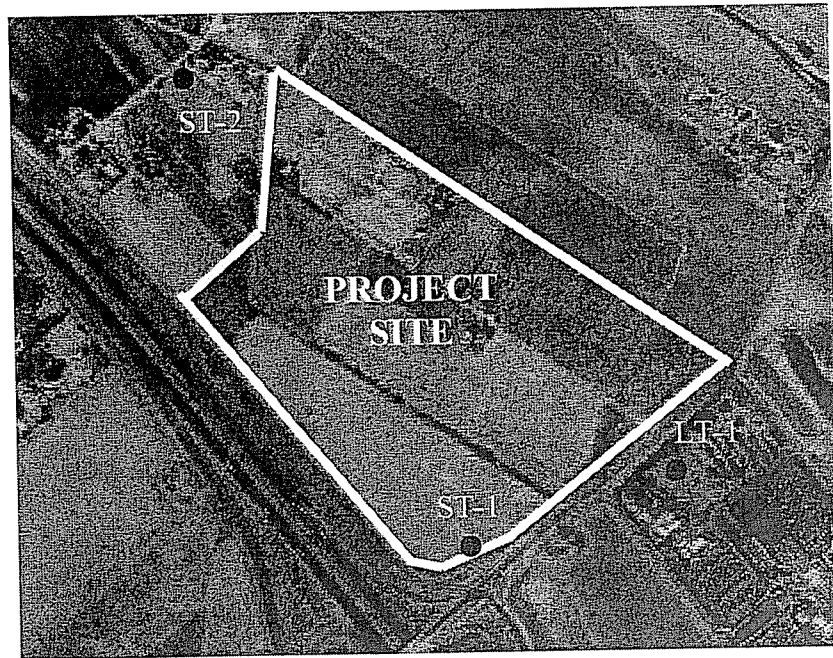


**Figure 1: Proposed Project Site Plan**

## EXISTING NOISE ENVIRONMENT

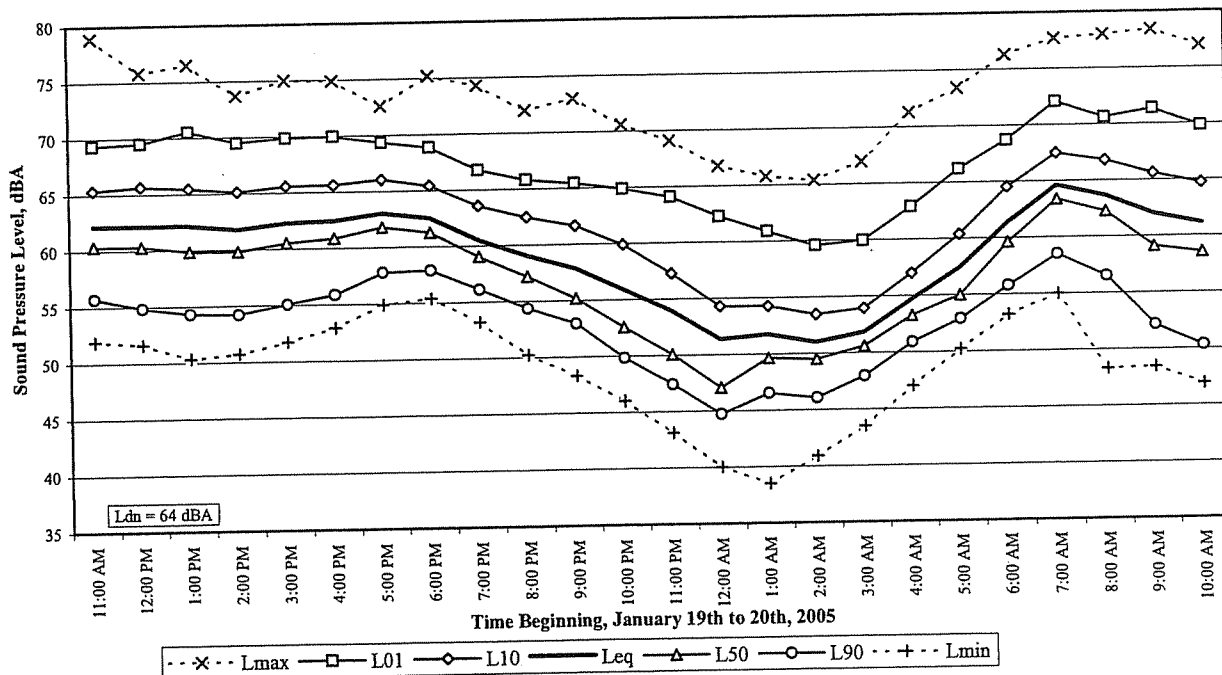
Land uses surrounding the project site include two single-family homes, vacant land planned for commercial uses and the former Saint Louise Hospital south of the project site; County land zoned for single-family residential uses east of the project site; agricultural lands with scattered residential uses north of the project site; and U.S. Highway 101 west of the project site. The closest noise sensitive receptors to the site are the two single-family homes south of Cochrane Road. Other, existing, noise sensitive uses are located at the southeast corner of Mission View Drive and Cochrane Road, approximately 1000 feet north of areas proposed for development on Peebles Avenue, and approximately 1300 feet east of areas proposed for development off of Peet Road.

The noise environment on the project site and the nearby noise sensitive receptors results primarily from vehicular traffic on Highway 101 and Cochrane Road. To evaluate the existing noise environment on and adjacent to the site one (1) twenty-four (24) hour (LT-1) and two (2) short-term spot (ST-1 & ST-2) noise measurements were made between 11 a.m. Thursday, January 19<sup>th</sup> and 11 a.m. Friday, January 20<sup>th</sup>, 2005 (see Figure 2). The long term measurement (LT-1, figure 2) was conducted a utility pole 130 feet south of the Cochrane Road centerline and west of the existing single family home at the corner of St. Louis Drive and Cochrane Road. The hourly trend in noise levels at the measurement site including the energy equivalent noise level ( $L_{eq}$ ), maximum ( $L_{max}$ ), minimum ( $L_{min}$ ), and the noise level exceeded 10, 50, and 90 percent of the time (indicated as  $L_{10}$ ,  $L_{50}$  and  $L_{90}$ ) is shown on Chart 1, below.



**Figure 1: Project Site with Measurement Locations**

**Chart 1: Long term Measurement Results**  
130 feet from the centerline of Cochrane Road



A review of Chart 1 shows that average ( $L_{eq}$ ) noise levels ranged from 58 to 65 dBA daytime and 51 to 61 dBA nighttime. The overall average daytime and nighttime  $L_{eq}$  levels were found to be 62 and 56 dBA, respectively. The  $L_{dn}$  measured at this location was calculated to be 64 dBA.

The first short term noise measurement (ST-1, see Figure 2) was conducted simultaneously with the long-term measurement in the southwest portion of the project site approximately 200 feet west of the Hwy 101 right of way line and 200 feet from the centerline of Cochrane Road. The results of this measurement show that due to the shielding provided by the existing terrain of Hwy 101 traffic noise, (i.e. Hwy 101 is below the site grade for the entirety of the project site) the average noise level at ST-1 was 3 dBA below those at the long term position. The estimated  $L_{dn}$  at this location is therefore 61 dBA.

The second short term noise measurement (ST-2, see Figure 1) was conducted in the rural residential area along Peebles Avenue north of the project site. The results of this measurement show that the average daytime sound levels away from major sources of the noise such as Hwy 101 and Cochrane Road range from 52 to 56 dBA, yielding an estimated  $L_{dn}$  of 56 dBA.

Founded on the results of the traffic study conducted by Fehr & Peers for the project and based on a consideration that the project traffic mix would be similar to that currently using area roadways, the relative increases in decibel levels on all area roadways have been recalculated based on the logarithmic relationship between differing peak hour traffic volumes. This method, which is expressed as:

$$\text{Decibel Increase} = 10 \times \text{LOG}(\text{future traffic vol.} / \text{existing traffic vol.})$$

With this method of predicting future traffic noise levels, a 25% increase in future traffic volumes results in an approximate increase in traffic noise of 1 dBA. This analysis showed that under existing conditions with the project in place traffic noise levels on Cochrane Road will increase by 2 to 6 decibels between Hwy 101 and east of Mission View Drive, with an increase of 4 dBA at the two homes on the south side of Cochrane Road across from the project. This would increase the  $L_{dn}$  at these homes to 68 dBA under existing conditions with the contribution of project related traffic. Homes southeast of the corner of Cochrane Road and Mission View Drive would experience a 1 dBA increase along the Cochrane Road frontage and a 4 dBA increase along Mission View Drive frontage. Based on a comparison of the existing traffic volumes on these roadway to the traffic on Cochrane Road past the long term noise measurement site and without considering the benefit of the sound wall built along these roadways, the current  $L_{dn}$ 's at the Cochrane Road and Mission View Drive frontages of the homes southeast of the corner of Cochrane Road and Mission View Drive are estimated at 60 dBA. When the sound reduction provided by a typical 6 foot high soundwall is considered then the  $L_{dn}$  at the homes in this area are estimated at 54 dBA. With the above increases in existing volumes due to the project related traffic, the  $L_{dn}$  at the homes on the Cochrane Road frontage is estimated at 55 dBA, while those on the Mission View Drive frontage is estimated at 58 dBA. The noise environment in the vicinity of the noise sensitive receptors north and east of the project site would be expected to remain relatively constant under existing conditions with the project since these areas removed from major traffic noise sources.

## **FUTURE NOISE ENVIRONMENT**

Our analysis of the traffic study for future (cumulative) conditions showed that traffic noise levels on Cochrane Road will increase by 2 to 5 decibels between Hwy 101 and east of Mission View Drive,

with an increase of 3 dBA at the two homes on the south side of Cochrane Road without the project in place. This would increase the  $L_{dn}$  at these homes to 67 dBA without the contribution of project related traffic.

For future (cumulative) conditions with project traffic noise levels on Cochrane Road will increase by 2 to 4 decibels above the cumulative increases between Hwy 101 and east of Mission View Drive, with an additional increase of 3 dBA at the two homes on the south side of Cochrane Road without the project in place. This would increase the  $L_{dn}$  at these homes to 70 dBA under future conditions with project-generated traffic. Cumulative increases alone will increase sound levels at the Cochrane Road frontage and the Mission View Drive frontage of the homes southeast of the corner of Cochrane Road respectively by 2 dBA and 1 dBA. Homes southeast of the corner of Cochrane Road and Mission View Drive would experience an additional 1 dBA increase along the Cochrane Road frontage and an additional 4 dBA increase along Mission View Drive frontage above these cumulative (non-project related) increases due to project related traffic. Based on a comparison of the cumulative and existing traffic volumes on these roadways, the above increases in project related traffic, and considering the benefit of the sound wall built along these roadways the future  $L_{dn}$  with the project in place at the homes on the Cochrane Road frontage is estimated at 57 dBA, while those on the Mission View Drive frontage is estimated at 59 dBA. The future noise environment in the vicinity of the noise sensitive receptors removed from Cochrane Road north and east of the project site due to project-generated traffic would be expected to remain relatively constant under future conditions without the project since these areas are removed from major traffic noise sources.

The major noise sources associated with the operation of the proposed retail development would be parking lot activity, truck delivery, loading dock activity, activity at the outdoor garden center, and noise generated by fixed mechanical equipment typically located on top of large and small retail stores. The following summarizes noise levels generated by these activities as measured by Illingworth & Rodkin, Inc. at typical large-scale retail developments:

- (1) *Delivery Truck Traffic.* Noise generated by delivery trucks depends primarily on the truck. Maximum noise levels generated by diesel trucks pulling into and out of loading docks ranges from 73 to 80 dBA measured at a distance of 50 feet. The maximum instantaneous A-weighted noise levels generated by step vans and smaller gasoline-powered delivery trucks ranges from 60 to 69 dBA at a distance of 50 feet.
- (2) *Loading Dock Activity.* Maximum noise levels generated at loading docks typically reach 80 dBA at a distance of 50 feet. These maximum noise levels were generated by banging and clanging of metal containers and loud voices.
- (3) *Outdoor Garden Centers.* Noise source associated with the outdoor garden center include a public address system. The typical noise level of a garden center PA is about 50 dBA at a distance of 50 feet (this level may need to be increased to around 60 dBA at 50 feet due to the higher existing ambient noise). Forklifts typically generate a level of 60 to 70 dBA at a distance of 50 feet. Carts and voices typically generate noise levels of 50 to 55 dBA at a distance of 50 feet.
- (4) *Rooftop-Mounted Mechanical Equipment.* Noise generated by rooftop-mounted mechanical equipment varies significantly depending on the type of equipment and the size. Based on measurements made at similar stores, a noise level of 60 to 70 dBA at a distance of 50 feet from the mechanical equipment would be typical.
- (5) *Trash Compactors.* Trash compactors typically generate maximum noise levels of 45 to 50 dBA at 150 feet, depending on the power rating and enclosure characteristics.

- (6) *Parking Lot Cleaning.* Typically, the parking area surface at a shopping center is periodically cleaned using small mechanical parking lot sweepers and handheld back-mounted leaf blowers. Noise measurements conducted of this type of operation at a distance of 150 feet determined that the noise levels generated by the parking lot sweepers was not measurable but that the noise levels generated by leaf blowers ranged from 60 to 70 dBA at a distance of 150 feet.
- (7) *Parking Lot Activity.* Noise measurements conducted at parking lots indicate that at a distance of 150 feet, maximum noise levels generated by cars or trucks passing by, doors slams, and engines starting range from about 47 to 52 dBA.

Based on the layout of the proposed retail development, the relative distances from surrounding noise sensitive land-uses, and the use of line source (for truck passbys) and point source (for loading and unloading trucks, mechanical equipment, trash compactors, and parking lot noises) sound attenuation models, we have determined that noise levels generated by the operation of the retail development would be at or below the existing average (Leq) noise levels at all adjacent noise sensitive receptors.

## IMPACTS AND MITIGATION MEASURES

### *Significance Criteria*

Noise impacts associated with the proposed retail development would be considered significant if the noise levels generated by activity on the site would exceed the noise level performance standards contained in the City of Morgan Hill's General Plan Noise Element (see Appendix B).

### **IMPACT 1a: Traffic Noise Impacts on Adjacent Noise Sensitive Land Uses across for the Project Site**

The proposed project on Cochrane Road would result in traffic noise on adjacent land uses of 3dBA or more in areas exceeding an Ldn of 60 dBA. *This is a significant impact.*

Our analysis has shown that traffic related to the development and use of the retail site will result in an increase in noise levels along Cochrane Road under existing conditions of between 2 to 6 decibels between Hwy 101 and east of Mission View Drive, with an increase of 4 dBA at the two homes on the south side of Cochrane Road across from the project. This would increase the L<sub>dn</sub> at these homes to 68 dBA under existing conditions.

Future noise levels with project traffic versus those without project traffic project traffic would be 2 to 4 decibels higher along Cochrane Road, with an increase of 3 dBA at the two homes on the south side of Cochrane Road across from the project. This would increase the L<sub>dn</sub> at these homes to 70 dBA under future conditions with the project.

### **MITIGATION 1a: ~~Traffic Noise Impacts on Adjacent Land Uses.~~**

~~The two existing residential uses south of the project site and all other noise sensitive uses adjacent to Cochrane Road should noise sensitive uses~~

~~Current~~ Noise levels at the existing residences south of Cochrane Road across from the project site currently exceed the City's normally acceptable noise levels of 60 dBA L<sub>dn</sub>. Mitigation measures at the residences on the south side of Cochrane Road across from the project ~~se residences and all other noise sensitive uses adjacent to Cochrane Road~~ should be developed to reduce noise level increases due to project generated traffic. A possible mitigation measures to reduce this noise impact includes the construction of noise barriers along the roadway, however this measure may not be feasible due to the need for access to these properties or where any walls that could be effective may raise safety concerns and be visually and aesthetically intrusive. In addition, front yards are not usually the primary outdoor use areas. Acoustical treatments to the residential structures such as replacing existing windows with sound rated windows and providing mechanical ventilation could mitigate the noise increase attributable to the project. The noise reduction required of the replacement windows could be determined by field measurement, as would the need for mechanical ventilation.

**IMPACT 1b: Traffic Noise Impacts on Noise Sensitive Land Uses southeast of the Cochrane Road/Mission View Drive intersection**

The proposed project on would result in traffic noise level increases at the noise sensitive land uses southeast of the Cochrane Road/Mission View Drive of up to 4 dBA with a future noise level project to be less than 60 dBA at these uses with the existing sound wall in place. *This is not a significant impact.*

**MITIGATION 1b: None Required**

**IMPACT 2: Traffic Noise Impacts on the Project**

Noise levels on the site at the setback of the proposed Retail development would be considered conditionally acceptable for commercial use. *Given the existing site plan and standard building construction techniques, this would not be considered a significant impact.*

Based on the results of our noise analysis, the facades of the retail development closest to Cochrane Road and Hwy 101 would be exposed to an L<sub>dn</sub> of 70 dBA or less. According to the noise and land use compatibility guidelines contained in the Noise Element of the City of Morgan Hill's General Plan, this level of noise would fall within the normally acceptable range for commercial uses.

**MITIGATION 2: Traffic Noise Impacts on the Project**  
None Required

**IMPACT 3: Operational Project Generated Noise**

Noise levels generated by the operation of the retail development would be at or below the existing average (Leq) noise levels at all existing adjacent noise sensitive receptors. *This is not a significant impact.*

**MITIGATION 3: Operational Project Generated Noise**  
None Required

**IMPACT 4: Construction Noise**

Construction activities at the project site would temporarily elevate noise levels on the project site with maximum noise levels ranging from 79-89 dB at 50 feet from the activities. *This is considered a potentially significant impact but would be less than significant with mitigation.*

During the construction phases of the proposed project, noise from construction activities would add to the noise environment in the project area affecting two single family homes located south of Cochrane Road, as well as residential uses located at the southeast corner of Mission View Drive and Cochrane Road, approximately 1,000 feet to the north, and 1,300 feet east of the project site. Noise generated during construction would differ depending on the construction phase and the type and amount of equipment used at the construction site. Construction activities would include site grading, removal of material, construction of new exterior walls and roof, exterior and interior finishing, and the installation of equipment. The highest noise levels would be generated during site grading when heavy equipment would be used to remove materials and grade the site, with somewhat lower noise levels occurring during building construction and finishing. Activities involved in construction could generate maximum noise levels, as indicated in Table 1, ranging from 71 to 89 dB at a distance of 50 feet. At the two single family homes located south of Cochrane Road, these noise levels would be reduced to between 59 to 77 dBA, while at the residential uses located approximately 1,000 feet to the north and 1,300 feet east of the project site construction noise on the site would produced levels of between 45 and 63 dBA. Noise would also be generated during the construction phase by increased truck traffic and commute trips on area roadways. A significant project-generated noise source would be truck traffic associated with transport of heavy materials and equipment to and from the construction site. This noise increase would be of short duration and would likely occur primarily during daytime hours.

**Table 2: Typical Ranges of Energy Equivalent Noise Levels at 50 Feet,  
L<sub>eq</sub> in dBA, at Construction Sites**

Construction Activity	Type of Project being Constructed					
	Office Building, Hotel, Hospital, School, Public Works		Industrial Parking Garage, Religious Amusement & Recreations, Store, Service Station		Public Works Roads & Highways, Sewers, and Trenches	
	I	II	I	II	I	II
Ground Clearing	84	84	84	83	84	84
Excavation	89	79	89	71	88	78
Foundations	78	78	77	77	88	88
Erection	87	75	84	72	79	78

Finishing	89	75	89	74	84	84
I - All pertinent equipment present at site.						
II - Minimum required equipment present at site.						

Source: U.S.E.P.A., Legal Compilation on Noise, Vol. 1, p. 2-104, 1973.

Construction activities would be temporary in nature and are anticipated to occur during normal daytime working hours. However, because construction activities would result in periods of elevated noise levels during the evening and/or early morning hours that may exceed the thresholds for sensitive receptors in the project area, this impact is considered **potentially significant**. The following mitigation measure would reduce this potentially significant impact to a less than significant level.

#### **MITIGATION 4: Construction Noise**

In compliance with Section 8.28.040 of the *City of Morgan Hill Municipal Code*, construction at the project site shall be limited to 7:00 AM to 8:00 PM, Monday through Friday, and between the hours of 9:00 AM to 6:00 PM on Saturdays. Construction activities shall be prohibited on Sundays or Federal Holidays.

Implementation of the above measure would reduce construction related noise impacts to a **less than significant level** by requiring that construction activities take place only during specified times and that standard construction practices attenuate the affects of noise as much as possible in order to ensure that sensitive receptors in the vicinity of the project site are not adversely affected by the proposed project.

## APPENDIX A

### FUNDAMENTAL CONCEPTS OF ENVIRONMENTAL ACOUSTICS

Noise may be defined as unwanted sound. Noise is usually objectionable because it is disturbing or annoying. The objectionable nature of sound could be caused by its *pitch* or its loudness. *Pitch* is the height or depth of a tone or sound, depending on the relative rapidity (frequency) of the vibrations by which it is produced. Higher pitched signals sound louder to humans than sounds with a lower pitch. *Loudness* is intensity of sound waves combined with the reception characteristics of the ear. Intensity may be compared with the height of an ocean wave in that it is a measure of the amplitude of the sound wave.

In addition to the concepts of pitch and loudness, there are several noise measurement scales which are used to describe noise in a particular location. A *decibel (dB)* is a unit of measurement which indicates the relative amplitude of a sound. The zero on the decibel scale is based on the lowest sound level that the healthy, unimpaired human ear can detect. Sound levels in decibels are calculated on a logarithmic basis. An increase of 10 decibels represents a ten-fold increase in acoustic energy, while 20 decibels is 100 times more intense, 30 decibels is 1,000 times more intense, etc. There is a relationship between the subjective noisiness or loudness of a sound and its intensity. Each 10 decibel increase in sound level is perceived as approximately a doubling of loudness over a fairly wide range of intensities. Technical terms are defined in Table A1.

Because sound levels can vary markedly over a short period of time, a method for describing either the average character of the sound or the statistical behavior of the variations must be utilized. Most commonly, environmental sounds are described in terms of an average level that has the same acoustical energy as the summation of all the time-varying events. This energy-equivalent sound/noise descriptor is called  $L_{eq}$ . The most common averaging period is hourly, but  $L_{eq}$  can describe any series of noise events of arbitrary duration.

The scientific instrument used to measure noise is the sound level meter. Sound level meters can accurately measure environmental noise levels to within about plus or minus 1 dBA. Various computer models are used to predict environmental noise levels from sources, such as roadways and airports. The accuracy of the predicted models depends upon the distance the receptor is from the noise source. Close to the noise source, the models are accurate to within about plus or minus 1 to 2 dBA.

Since the sensitivity to noise increases during the evening and at night -- because excessive noise interferes with the ability to sleep -- 24-hour descriptors have been developed that incorporate artificial noise penalties added to quiet-time noise events. The *Community Noise Equivalent Level, CNEL*, is a measure of the cumulative noise exposure in a community, with a 5 dB penalty added to evening (7:00 pm - 10:00 pm) and a 10 dB addition to nocturnal (10:00 pm - 7:00 am) noise levels. The *Day/Night Average Sound Level,  $L_{dn}$* , is essentially the same as CNEL, with the exception that the evening time period is dropped and all occurrences during this three-hour period are grouped into the daytime period.

TERM	DEFINITIONS
Decibel, dB	A unit describing the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure, which is 20 micropascals (20 micronewtons per square meter).
Frequency, HZ	The number of complete pressure fluctuations per second above and below atmospheric pressure.
A-Weighted Sound Level, dB	The sound pressure level in decibels as measured on a sound level meter using the A-weighting filter network. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective reactions to noise. All sound levels in this report are A-weighted, unless reported otherwise.
$L_{01}$ , $L_{10}$ , $L_{50}$ , $L_{90}$	The A-weighted noise levels that are exceeded 1%, 10%, 50%, and 90% of the time during the measurement period.
Equivalent Noise Level, $L_{eq}$	The average A-weighted noise level during the measurement period.
Community Noise Equivalent Level, CNEL	The average A-weighted noise level during a 24-hour day, obtained after addition of 5 decibels in the evening from 7:00 pm to 10:00 pm and after addition of 10 decibels to sound levels measured in the night between 10:00 pm and 7:00 am.
Day/Night Noise Level, $L_{dn}$	The average A-weighted noise level during a 24-hour day, obtained after addition of 10 decibels to levels measured in the night between 10:00 pm and 7:00 am.
$L_{max}$ , $L_{min}$	The maximum and minimum A-weighted noise level during the measurement period.
Ambient Noise Level	The composite of noise from all sources near and far. The normal or existing level of environmental noise at a given location.
Intrusive	That noise which intrudes over and above the existing ambient noise at a given location. The relative intrusiveness of a sound depends upon its amplitude, duration, frequency, and time of occurrence and tonal or informational content as well as the prevailing ambient noise level.

## Definitions Of Acoustical Terms

**Table A1**

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There are several methods of characterizing sound. The most common in California is the A-weighted sound level or dBA. This scale gives greater weight to the frequencies of sound to which the human ear is most sensitive. Representative outdoor and indoor noise levels in units of dBA are shown in Table A2.

At a Given Distance From Noise Source	A-Weighted Sound Level in Decibels	Noise Environments	Subjective Impression
Civil Defense Siren (100')	140		
Jet Takeoff (200')	130		
	120		
Diesel Pile Driver (100')	110	Rock Music Concert	Pain Threshold
	100		
Freight Cars (50')	90	Boiler Room	Very Loud
Pneumatic Drill (50')		Printing Press Plant	
Freeway (100')	80		
Vacuum Cleaner (10')	70	In Kitchen With Garbage Disposal Running	Moderately Loud
Light Traffic (100')	60		
Large Transformer (200')	50	Data Processing Center	
	40	Department Store	
Soft Whisper (5')	30	Private Business Office	Quiet
	20		
	10	Quiet Bedroom	
	0	Recording Studio	Threshold of Hearing
<b>Typical Sound Levels Measured in the Environment and Industry</b>			<b>Table A2</b>

**ILLINGWORTH & RODKIN, INC./Acoustical Engineers**

The thresholds for speech interference indoors are about 45 dBA, if the noise is steady, and above 55 dBA, if the noise is fluctuating. Outdoors these thresholds are about 15 dBA higher. Interior residential standards for multi-family dwellings are set by the State of California at 45 dBA L<sub>dn</sub>.

Typically, the highest steady traffic noise level during the daytime is about equal to the  $L_{dn}$  and nighttime levels are 10 dBA lower. As discussed above, this standard is designed for sleep and speech protection and most jurisdictions apply the same criterion for all residential uses.

Typical structural attenuation is 12-17 dBA with open windows. With closed windows in good condition, the noise attenuation factor is around 20 dBA for an older structure and 25 dBA for a newer dwelling. Therefore, with typical construction, sleep and speech interference is possible when exterior noise levels are about 57-62 dBA  $L_{dn}$  with open windows and 65-70 dBA  $L_{dn}$  if windows are closed.

### **Actions**

- 7.1 Assess and track noise levels when specific projects are proposed to determine the continued accuracy of the Noise Contour map. If necessary, based on these assessments, update the future noise contour map to reflect changed conditions.
- 7.2 The Noise Contour map shall be used to screen projects to determine if acoustical studies shall be required.
- 7.3 Require attention to site planning and design techniques other than sound walls to reduce noise impacts, including: a) installing earth berms, b) increasing the distance between the noise source and the receiver; c) using non-sensitive structures such as parking lots, utility areas, and garages to shield noise-sensitive areas; d) orienting buildings to shield outdoor spaces from the noise source; and e) minimizing the noise at its source.
- 7.4 Amend the Zoning Ordinance to reflect noise limits intended to protect noise sensitive land uses from intrusion by stationary noise sources.

### **Goal 8. Protection from noise associated with motor vehicles and railroad activity** **Policies**

- 8a. Roadway design, traffic signalization and other traffic planning techniques (such as limiting truck traffic in residential areas) shall be used to reduce noise caused by speed or acceleration of vehicles.
- 8b. If noise barriers are deemed the only effective mitigation for development along major transportation corridors, an acoustical analysis shall be conducted to determine necessary dimensions.
- 8c. The maximum height of sound walls shall be eight feet. Residential projects adjacent to the freeway shall be designed to minimize sound wall height through location of a frontage road, use of two sound walls or other applicable measures. Sound wall design and location shall be coordinated for an entire project area and shall meet Caltrans noise attenuation criteria for a projected eight-lane freeway condition. If two sound walls are used, the first shall be located immediately adjacent to the freeway right-of-way and the second shall be located as necessary to meet Caltrans noise requirements for primary outdoor areas. The minimum rear yard setback to the second wall shall be 20 feet.
- 8d. Ensure that sound barriers do not become targets for vandalism.

### **Actions**

- 8.1 Allow and encourage earth berms in new development projects as an alternative to sound walls if adequate space is available.
- 8.2 Require non-earthen sound barriers to be landscaped, vegetated or otherwise designed and/or obscured to improve aesthetics and discourage graffiti and other vandalism.

### **Actions**

- 7.1 Assess and track noise levels when specific projects are proposed to determine the continued accuracy of the Noise Contour map. If necessary, based on these assessments, update the future noise contour map to reflect changed conditions.
- 7.2 The Noise Contour map shall be used to screen projects to determine if acoustical studies shall be required.
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- 7.4 Amend the Zoning Ordinance to reflect noise limits intended to protect noise sensitive land uses from intrusion by stationary noise sources.

### **Goal 8. Protection from noise associated with motor vehicles and railroad activity**





























































#### **Policies**

- 8a. Roadway design, traffic signalization and other traffic planning techniques (such as limiting truck traffic in residential areas) shall be used to reduce noise caused by speed or acceleration of vehicles.
- 8b. If noise barriers are deemed the only effective mitigation for development along major transportation corridors, an acoustical analysis shall be conducted to determine necessary dimensions.
- 8c. The maximum height of sound walls shall be eight feet. Residential projects adjacent to the freeway shall be designed to minimize sound wall height through location of a frontage road, use of two sound walls or other applicable measures. Sound wall design and location shall be coordinated for an entire project area and shall meet Caltrans noise attenuation criteria for a projected eight-lane freeway condition. If two sound walls are used, the first shall be located immediately adjacent to the freeway right-of-way and the second shall be located as necessary to meet Caltrans noise requirements for primary outdoor areas. The minimum rear yard setback to the second wall shall be 20 feet.
- 8d. Ensure that sound barriers do not become targets for vandalism.

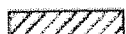
### **Actions**

- 8.1 Allow and encourage earth berms in new development projects as an alternative to sound walls if adequate space is available.
- 8.2 Require non-earthen sound barriers to be landscaped, vegetated or otherwise designed and/or obscured to improve aesthetics and discourage graffiti and other vandalism.

**Table 9. Acceptable Noise Levels**

Land Use Category	Community Noise Exposure Ldn or CNEL, dBA					
	55	60	65	70	75	80
Residential: Single Family Duplexes, Mobile Homes						
Residential: Multi-family						
Transient Lodging: Motels, Hotels						
Schools, Libraries, Churches, Hospitals, Nursing Homes						
Auditoriums, Concert Halls Amphitheaters						
Sports Arena, Outdoor Spectator Sports						
Playgrounds, Neighborhood Parks						
Golf Courses, Riding Stables, Water Recreation, Cemeteries						
Office Buildings, Business Commercial and Professional						
Industrial, Manufacturing, Utilities, Agriculture						

**INTERPRETATION**



**NORMALLY ACCEPTABLE**

Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements.



**CONDITIONALLY ACCEPTABLE**

New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features included in the design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning will normally suffice.



**NORMALLY UNACCEPTABLE**

New construction or development should generally be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design.



**CLEARLY UNACCEPTABLE**

New construction or development should generally not be undertaken.

Source: Office of Planning and Research, State of California General Plan Guidelines, Appendix A: Guidelines for the Preparation and Content of the Noise Element of the General Plan, 1990.

